ALAMEDA COUNTY
HEALTH CARE SERVICES
AGENCY
ALEX BRISCOE, Agency Director

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ENVIRONMENTAL PROTECTION
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June 19, 2014

Mr. Christopher Payne
ARC - Blue Print Service
945 Bryant Street
San Francisco, CA 94103
(Sent via E-mail to: christopher.payne@e-arc.com)

Mr. Matthew Westbrook
ARC Document Solutions
1981 N. Broadway, Suite 385
Walnut Creek, CA 94596

Subject: Modified Approval of Work Plan Addendum; Fuel Leak Case No. RO0000151 and GeoTracker Global ID T0600100196, City Blue Print, 1700 Jefferson St., Oakland, CA 94612

Dear Messrs. Payne and Westbrook:

Alameda County Environmental Health (ACEH) staff has reviewed the case file including the *Semi-Annual Ground Water Monitoring Report,* dated December 2013, and the *Work Plan Addendum*, dated March 27, 2014, which were prepared and submitted on your behalf by Applied Water Resources (AWR). The work plan recommends advancing six onsite soil borings to define contamination at the site, six offsite soil bores to collect grab groundwater samples to define the lateral extent of the groundwater plume, and five temporary vapor points to determine on- and off-site soil vapor concentrations.

ACEH has previously evaluated site data to determine if the site is eligible for closure as a low risk site under the State Water Resources Control Board's (SWRCBs) Low Threat Underground Storage Tank Case Closure Policy (LTCP). Based on ACEH staff review, we have determined that the site fails to meet the LTCP General Criteria d (Free Product), and the Media-Specific Criteria for Groundwater, the Media-Specific Criteria for Vapor Intrusion to Indoor Air, and the Media-Specific Criteria for Direct Contact (see Geotracker for details).

Based on ACEH staff review of the work plan, the proposed scope of work is conditionally approved for implementation provided that the technical comments below are incorporated during the proposed work and justification of the installation depth of the vapor well is first communicated and approved as requested below. ACEH would like to schedule a telephone call with you to discuss these comments.

Submittal of a revised work plan or a work plan addendum is not required unless an alternate scope of work outside that described in the work plan or these technical comments is proposed. We request that you address the following technical comments, perform the proposed work, and send us the report described below. Once field work is approved, please provide 72-hour advance written notification to this office (e-mail preferred to: mark.detterman@acgov.org) prior to the start of field activities.

TECHNICAL COMMENTS

1. **Work Plan Clarifications –** The referenced work plan proposes a series of actions with which ACEH is in general agreement of undertaking; however, ACEH requests several important modifications to the approach.

   a. **Evaluation of Residual Source Areas Onsite –** Residual source areas appear to remain onsite as evidenced by the high groundwater concentrations of Total Petroleum Hydrocarbons as gasoline (TPHg) and benzene. The work plan proposes to install six onsite soil bores to evaluate the presence of residual vadose zone contamination in the vicinity of the former underground storage tanks (USTs), dispenser islands, and backfilled areas of the site. The work plan did not describe the collection and retention of soil samples for the purposes of characterizing the soil.

Therefore, ACEH requests that soil samples be collected, retained, and submitted for laboratory analysis at lithologic changes, photoionization detector (PID) readings, staining, or other signs of contamination, and at the soil-groundwater interface. Additionally, to satisfy the Direct Contact and Outdoor Air Media-Specific Criteria, ACEH requests the collection of soil samples in the 0 to 5 and the 5 to 10 foot depth intervals in the bores.

Additionally, ACEH requests installation of an additional soil bore based on the review of Sanborn Maps which indicate a "Pit" was formerly located in the northwestern corner of the subject property. While the use is not explained, it appears appropriate to investigate the potential that the pit was a service pit associated with the former service station. Soil samples are requested to include standard analytes for the site (TPHg, benzene, toluene, ethylbenzene, toluene, total xylenes [BTEX], and methyl tert butyl ether [MTBE]) in addition to TPH as diesel (TPHd), TPH as motor oil (TPHmo), and naphthalene. Please submit a revised Figure 2 to document the proposed bore location, by the date requested below.

b. Evaluation of Residual Source Areas Offsite – Due to the homogeneous fine-grained sand sediments in the subsurface and high concentrations of TPH and benzene in downgradient well MW-5 (30,000 micrograms per liter [µg/l] TPHg and 13,000 µg/l benzene), it is appropriate to advance soil borings to investigate residual soil contamination offsite in the smear zone. The work plan proposes to install six offsite soil bores to collect grab groundwater samples to characterize the downgradient groundwater contaminant plume. The work plan indicates that soil samples will be collected for lithologic and PID readings in order to determine an appropriate groundwater sampling depth. The work plan did not describe the collection, retention, and laboratory analysis of soil samples for the purposes of characterizing soil downgradient of the site.

Therefore, ACEH requests that soil samples be collected, retained, and submitted for laboratory analysis at indications of contamination as described above, and just above the soil-groundwater interface. These soil samples are anticipated to be, but may not be, deeper in the stratigraphic section, in the smear zone, and close to the depth of groundwater.

For the soil bore proposed in the subgrade courtyard, at a depth of 11 to 13 feet below grade surface (bgs; see technical Comment 1d below), it is appropriate to collect soil samples in the 0 to 5 and 5 to 10 foot depth intervals beneath the courtyard, as measured from the courtyard grade, to characterize soil beneath the courtyard in accordance with the Direct Contact and Outdoor Air Media-Specific Criterion.

c. Soil and Groundwater Analytical Suite – The analytical suite for the site was not described in the referenced work plan addendum. The previous analytical suite for soil appears appropriate (TPHg, BTEX, and MTBE); however, it appears appropriate to additionally request that the five fuel oxygenates (TBA, DIPE, ETBE, TAME, and MTBE), ethanol and methanol, and the two lead scavengers (EDB and EDC), also be included in the grab groundwater analytical suite (Please see Technical Comment 5 below for a further explanation).

d. Soil Vapor Well Installation – The referenced work plan addendum reported on the collection of soil vapor at six of seven soil vapor points (A1 to A7; A5 encountered water at a depth of 21-inches bgs). The vapor samples were considered to be a relatively quick soil vapor screening tool and did not observe standard Department of Toxic Substances Control (DTSC) soil vapor sampling guidelines. To clarify terminology, ACEH regards the temporary wells (terminology used in the work plan addendum) to be vapor points, while ACEH regards the installation of vapor wells to be permanent constructions for the collection of soil vapor.

The work plan addendum proposed installation of five vapor points (described as temporary vapor wells) at the subject site, and local offsite vicinity. ACEH is in general agreement that the locations appear appropriate; however, it is appropriate to request that the proposed vapor points be installed as permanent vapor wells due to their proximity to building structures, and the intended assessment of the potential for health risks from vapors to these structures. In accordance with DTSC guidelines, and due to the high concentrations of TPH and benzene in

well MW-5 downgradient of a building with a full below-grade story, ACEH requires installation of permanent vapor wells to assess temporal and seasonal variations in soil gas concentrations.

The LTCP requires that vapor wells be installed 5 feet below the foundation of an existing site building. Based on ACEHs review of site data difficulties in assessing the risk of vapor intrusion to indoor air are encountered at the site due to two significantly different foundational depths in close proximity across property lines. ACEH requests that onsite vapor wells be installed to a depth of five feet below the foundation for the onsite building. Installation at this depth will also yield useful information for the adjacent offsite building with the deeper foundation. For offsite soil vapor wells, please communicate and justify the depth of installation for the vapor wells prior to installation based on the foundation depths as requested in Technical Comment 3 below.

Please also note that Google Earth reports that the below-grade courtyard for the adjacent downgradient building is 13 feet bgs, rather than 11 feet as reported in the referenced work plan addendum. Should access be denied for the installation of a vapor well in the courtyard, it appears that the appropriate depth of installation will be five feet below this depth, unless the foundation for the adjacent building is deeper. However, ACEH considers installation of a vapor well in the courtyard to be important to assessing risk to the adjacent building and courtyard. Please communicate any access denial and ACEH may be able to provide assistance.

e. Soil Vapor Sampling – The installation of recently installed vapor points A1 to A7 generally observed the SOPs of AWS for "temporary wells"; however, the vapor points were not collected consistent with standard DTSC sampling guidelines. Included in differences was the lack of a sufficient equilibration time after installation of a hand augered soil bore (1 hour verses 48-hour described in DTSC guidance), consistent use of a tracer gas (helium was used only for vapor sample A2), consistent use of a vapor shroud (only vapor sample A2 used a shroud), lack of documentation of helium concentrations in the shroud (to determine acceptability of the vapor sample using DTSC guidance should helium be detected), and undetermined use of a shut-in test for sample A2.

Please ensure that your vapor sampling strategy is consistent with the field sampling protocols described in the Department of Toxic Substances Control's Final Vapor Intrusion Guidance (October 2011).

2. Previously Identified Data Gaps – The January 2013 *Conceptual Site Model and Work Plan* generated and submitted on your behalf by the Environmental Risk Specialties Corporation (ERS), identified an additional data gap that does not appear to have been included in previously submitted, or proposed work. This includes a sensitive receptor survey that conducts a review of vicinity water supply wells, investigates other subsurface constructions that require dewatering (sump pumps in building basements, elevator shafts, etc.), and investigates building foundational elements (basements, foundation depths, etc.) that eliminate the separation distance used by the LTCP to ensure health risks associated with contaminants released at the site are not a threat to humans or the environment. These latter details are requested in order to determine the appropriateness of vapor sampling depths in accordance with LTCP Petroleum Vapor Intrusion to Indoor Air Criteria, as discussed in Technical Comment 3 below.

Therefore, ACEH requests that a well survey be conducted, and included in the report requested below, using Department of Water Resources (DWR) and Alameda County Public Works Agency (ACPWA) well data resources. The two databases are sufficiently different to warrant review of both. Please include a list of addresses and a map of locations of any found wells. Please be aware that well construction details are confidential; however, well location and addresses are not and can be included in the report requested below.

3. Report on Foundation Depths - ACEH requests that a survey of site vicinity buildings be undertaken in order to determine if basements, elevators, or other subsurface constructions are present in the site vicinity that eliminate the separation distance between the surface environment and a potential receptor. This is expected to include the adjacent building which has a minimum of one full floor below grade, and likely has one or more elevator shafts that will extend deeper. It is

currently unknown if other such structures may be present in the site vicinity. Based on foundation details, please provide justification for onsite and offsite vapor well installation depths. ACEH requests this data be assembled and submitted as a report for review and approval prior to proceeding with vapor well installation, by the date identified below. The use of tables and figures to report and depict the areas of potential concern is requested.

4. **Site Investigation Report and Focused Site Conceptual Model –** Please address the Technical comments above, update the Site Conceptual Model (SCM), and report the results of the field work in a Site Investigation Report in accordance with the schedule below. Please review the site under the LTCP, and if appropriate include a Data Gap Work Plan for any remaining data gaps. Please include Data Quality Objectives (DQOs) in the Data Gap Work Plan that relate the data collection to each LTCP criteria. For example please clarify which scenario within each Media-Specific Criteria a sampling strategy is intended to apply to.

   In order to expedite review, ACEH requests the focused SCM be presented in a tabular format that highlights the major SCM elements and associated data gaps, which need to be addressed to progress the site to case closure under the LTCP. Please see Attachment A: *Site Conceptual Model Requisite Elements*. Please sequence any activities proposed to enable efficient data collection in the fewest mobilizations possible.

5. **Groundwater Monitoring and Sampling –** Please continue to conduct semi-annual groundwater monitoring and sampling and submit reports as identified below. Review of recent groundwater monitoring reports appears to indicate that the five fuel oxygenates and two lead scavengers (other than MTBE) have not been analyzed for in groundwater beneath the site. If this is incorrect, please tabulate the data in all future reports (site investigation and groundwater monitoring). Due to the apparent lack of degradation of benzene concentrations in site wells (for example see wells MW-1 and MW-5), there appears to be a potential for ethanol to be present beneath the site. Therefore, ACEH requests that these potential contaminates be included a minimum of one time. The continued need for this analysis should be evaluated thereafter.

TECHNICAL REPORT REQUEST

Please upload technical reports to the ACEH ftp site (Attention: Mark Detterman), and to the State Water Resources Control Board's Geotracker website, in accordance with the following specified file naming convention and schedule:

- **July 18, 2015 –** First 2014 Semi-Annual Groundwater Monitoring Report
  (File to be named RO151_GWM_R_yyyy-mm-dd)

- **August 1, 2014 –** Foundation Depth Report and Vapor Well Installation Depth Justification, and Revised Figure 2; (File to be named: RO151_MISC_R_yyyy-mm-dd)

- **60 Days After Vapor Well Installation Approval –** Site Investigation and Focused Site Conceptual Model; (File to be named: RO151_SWI_SCM_R_yyyy-mm-dd)

- **December 5, 2014 –** Second 2014 Semi-Annual Groundwater Monitoring Report
  (File to be named RO151_GWM_R_yyyy-mm-dd)

These reports are being requested pursuant to California Health and Safety Code Section 25296.10. 23 CCR Sections 2652 through 2654, and 2721 through 2728 outline the responsibilities of a responsible party in response to an unauthorized release from a petroleum UST system, and require your compliance with this request.

Online case files are available for review at the following website: http://www.acgov.org/aceh/index.htm. If your email address does not appear on the cover page of this notification, ACEH is requesting you

provide your email address so that we can correspond with you quickly and efficiently regarding your case.

Thank you for your cooperation. Should you have any questions or concerns regarding this correspondence or your case, please call me at (510) 567-6876 or send me an electronic mail message at mark.determan@acgov.org.

Sincerely,

Digitally signed by Mark E. Determan
DN: cn=Mark E. Determan, o, ou, email, c=US
Date: 2014.06.19 17:56:50 -07'00'

Mark E. Determan, P.G., C.E.G.
Senior Hazardous Materials Specialist

Enclosures: Attachment 1 - Responsible Party(ies) Legal Requirements/Obligations & ACEH Electronic Report Upload (ftp) Instructions

Attachment A – Site Conceptual Model Requisite Elements

cc: Tyson Fulmer, Applied Water Resources Corporation, 1600 Riviera Avenue, Suite 310, Walnut Creek, CA 94596 (Sent via E-mail to: tfulmer@awrcorp.net)

Yola Bayram, Applied Water Resources Corporation, 1600 Riviera Avenue, Suite 310, Walnut Creek, CA 94596 (Sent via E-mail to: ybayram@awrcorp.net)

Dilan Roe, ACEH (sent via electronic mail to dilan.roe@acgov.org)
Mark Detterman (sent via electronic mail to mark.detterman@acgov.org)
Electronic file, GeoTracker

Attachment 1

Responsible Party(ies) Legal Requirements / Obligations

REPORT REQUESTS

These reports are being requested pursuant to California Health and Safety Code Section 25296.10. 23 CCR Sections 2652 through 2654, and 2721 through 2728 outline the responsibilities of a responsible party in response to an unauthorized release from a petroleum UST system, and require your compliance with this request.

ELECTRONIC SUBMITTAL OF REPORTS

ACEH's Environmental Cleanup Oversight Programs (LOP and SLIC) require submission of reports in electronic form. The electronic copy replaces paper copies and is expected to be used for all public information requests, regulatory review, and compliance/enforcement activities. Instructions for submission of electronic documents to the Alameda County Environmental Cleanup Oversight Program FTP site are provided on the attached "Electronic Report Upload Instructions." Submission of reports to the Alameda County FTP site is an addition to existing requirements for electronic submittal of information to the State Water Resources Control Board (SWRCB) GeoTracker website. In September 2004, the SWRCB adopted regulations that require electronic submittal of information for all groundwater cleanup programs. For several years, responsible parties for cleanup of leaks from underground storage tanks (USTs) have been required to submit groundwater analytical data, surveyed locations of monitoring wells, and other data to the GeoTracker database over the Internet. Beginning July 1, 2005, these same reporting requirements were added to Spills, Leaks, Investigations, and Cleanup (SLIC) sites. Beginning July 1, 2005, electronic submittal of a complete copy of all reports for all sites is required in GeoTracker (in PDF format). Please visit the SWRCB website for more information on these requirements (http://www.waterboards.ca.gov/water_issues/programs/ust/electronic_submittal/).

PERJURY STATEMENT

All work plans, technical reports, or technical documents submitted to ACEH must be accompanied by a cover letter from the responsible party that states, at a minimum, the following: "I declare, under penalty of perjury, that the information and/or recommendations contained in the attached document or report is true and correct to the best of my knowledge." This letter must be signed by an officer or legally authorized representative of your company. Please include a cover letter satisfying these requirements with all future reports and technical documents submitted for this fuel leak case.

PROFESSIONAL CERTIFICATION & CONCLUSIONS/RECOMMENDATIONS

The California Business and Professions Code (Sections 6735, 6835, and 7835.1) requires that work plans and technical or implementation reports containing geologic or engineering evaluations and/or judgments be performed under the direction of an appropriately registered or certified professional. For your submittal to be considered a valid technical report, you are to present site specific data, data interpretations, and recommendations prepared by an appropriately licensed professional and include the professional registration stamp, signature, and statement of professional certification. Please ensure all that all technical reports submitted for this fuel leak case meet this requirement.

UNDERGROUND STORAGE TANK CLEANUP FUND

Please note that delays in investigation, later reports, or enforcement actions may result in your becoming ineligible to receive grant money from the state's Underground Storage Tank Cleanup Fund (Senate Bill 2004) to reimburse you for the cost of cleanup.

AGENCY OVERSIGHT

If it appears as though significant delays are occurring or reports are not submitted as requested, we will consider referring your case to the Regional Board or other appropriate agency, including the County District Attorney, for possible enforcement actions. California Health and Safety Code, Section 25299.76 authorizes enforcement including administrative action or monetary penalties of up to $10,000 per day for each day of violation.

Alameda County Environmental Cleanup Oversight Programs (LOP and SLIC)	**REVISION DATE:** May 15, 2014
	ISSUE DATE: July 5, 2005
	PREVIOUS REVISIONS: October 31, 2005; December 16, 2005; March 27, 2009; July 8, 2010, July 25, 2010
SECTION: Miscellaneous Administrative Topics & Procedures	**SUBJECT:** Electronic Report Upload (ftp) Instructions

The Alameda County Environmental Cleanup Oversight Programs (LOP and SLIC) require submission of all reports in electronic form to the county's ftp site. Paper copies of reports will no longer be accepted. The electronic copy replaces the paper copy and will be used for all public information requests, regulatory review, and compliance/enforcement activities.

REQUIREMENTS

- **Please do not submit reports as attachments to electronic mail.**
- Entire report including cover letter must be submitted to the ftp site as **a single portable document format (PDF) with no password protection**.
- It is **preferable** that reports be converted to PDF format from their original format, (e.g., Microsoft Word) rather than scanned.
- **Signature pages and perjury statements must be included and have either original or electronic signature.**
- **Do not password protect the document**. Once indexed and inserted into the correct electronic case file, the document will be secured in compliance with the County's current security standards and a password. **Documents with password protection will not be accepted**.
- Each page in the PDF document should be rotated in the direction that will make it easiest to read on a computer monitor.
- Reports must be named and saved using the following naming convention:

  RO#_Report Name_Year-Month-Date (e.g., RO#5555_WorkPlan_2005-06-14)

Submission Instructions

1) Obtain User Name and Password
   a) Contact the Alameda County Environmental Health Department to obtain a User Name and Password to upload files to the ftp site.
      i) Send an e-mail to deh.loptoxic@acgov.org
   b) In the subject line of your request, be sure to include **"ftp PASSWORD REQUEST"** and in the body of your request, include the **Contact Information, Site Addresses**, and the **Case Numbers (RO# available in Geotracker) you will be posting for**.

2) Upload Files to the ftp Site
   a) Using Internet Explorer (IE4+), go to ftp://alcoftp1.acgov.org
      (i) Note: Netscape, Safari, and Firefox browsers will not open the FTP site as they are NOT being supported at this time.
   b) Click on Page located on the Command bar on upper right side of window, and then scroll down to Open FTP Site in Windows Explorer.
   c) Enter your User Name and Password. (Note: Both are Case Sensitive.)
   d) Open "My Computer" on your computer and navigate to the file(s) you wish to upload to the ftp site.
   e) With both "My Computer" and the ftp site open in separate windows, drag and drop the file(s) from "My Computer" to the ftp window.

3) Send E-mail Notifications to the Environmental Cleanup Oversight Programs
   a) Send email to deh.loptoxic@acgov.org notify us that you have placed a report on our ftp site.
   b) Copy your Caseworker on the e-mail. Your Caseworker's e-mail address is the entire first name then a period and entire last name @acgov.org. (e.g., firstname.lastname@acgov.org)
   c) The subject line of the e-mail must start with the RO# followed by **Report Upload**. (e.g., Subject: RO1234 Report Upload) If site is a new case without an RO#, use the street address instead.
   d) If your document meets the above requirements and you follow the submission instructions, you will receive a notification by email indicating that your document was successfully uploaded to the ftp site.

ATTACHMENT A

Site Conceptual Model Requisite Elements

ATTACHMENT A

Site Conceptual Model

The site conceptual model (SCM) is an essential decision-making and communication tool for all interested parties during the site characterization, remediation planning and implementation, and closure process. A SCM is a set of working hypotheses pertaining to all aspects of the contaminant release, including site geology, hydrogeology, release history, residual and dissolved contamination, attenuation mechanisms, pathways to nearby receptors, and likely magnitude of potential impacts to receptors.

The SCM is initially used to characterize the site and identify data gaps. As the investigation proceeds and the data gaps are filled, the working hypotheses are modified, and the overall SCM is refined and strengthened until it is said to be "validated". At this point, the focus of the SCM shifts from site characterization towards remedial technology evaluation and selection, and later remedy optimization, and forms the foundation for developing the most cost-effective corrective action plan to protect existing and potential receptors.

For ease of review, Alameda County Environmental Health (ACEH) requests utilization of tabular formats to (1) highlight the major SCM elements and their associated data gaps which need to be addressed to progress the site to case closure (see Table 1 of attached example), and (2) highlight the identified data gaps and proposed investigation activities (see Table 2 of the attached example). ACEH requests that the tables presenting the SCM elements, data gaps, and proposed investigation activities be updated as appropriate at each stage of the project and submitted with work plans, feasibility studies, corrective action plans, and requests for closures to support proposed work, conclusions, and/or recommendations.

The SCM should incorporate, but is not limited to, the topics listed below. Please support the SCM with the use of large-scaled maps and graphics, tables, and conceptual diagrams to illustrate key points. Please include an extended site map(s) utilizing an aerial photographic base map with sufficient resolution to show the facility, delineation of streets and property boundaries within the adjacent neighborhood, downgradient irrigation wells, and proposed locations of transects, monitoring wells, and soil vapor probes.

a. Regional and local (on-site and off-site) geology and hydrogeology. Include a discussion of the surface geology (e.g., soil types, soil parameters, outcrops, faulting), subsurface geology (e.g., stratigraphy, continuity, and connectivity), and hydrogeology (e.g., water-bearing zones, hydrologic parameters, impermeable strata). Please include a structural contour map (top of unit) and isopach map for the aquitard that is presumed to separate your release from the deeper aquifer(s), cross sections, soil boring and monitoring well logs and locations, and copies of regional geologic maps.

b. Analysis of the hydraulic flow system in the vicinity of the site. Include rose diagrams for depicting groundwater gradients. The rose diagram shall be plotted on groundwater elevation contour maps and updated in all future reports submitted for your site. Please address changes due to seasonal precipitation and groundwater pumping, and evaluate the potential interconnection between shallow and deep aquifers. Please include an analysis of vertical hydraulic gradients, and effects of pumping rates on hydraulic head from nearby water supply wells, if appropriate. Include hydraulic head in the different water bearing zones and hydrographs of all monitoring wells.

c. Release history, including potential source(s) of releases, potential contaminants of concern (COC) associated with each potential release, confirmed source locations, confirmed release locations, and existing delineation of release areas. Address primary leak source(s) (e.g., a tank, sump, pipeline, etc.) and secondary sources (e.g., high-

concentration contaminants in low-permeability lithologic soil units that sustain groundwater or vapor plumes). Include local and regional plan view maps that illustrate the location of sources (former facilities, piping, tanks, etc.).

d. Plume (soil gas and groundwater) development and dynamics including aging of source(s), phase distribution (NAPL, dissolved, vapor, residual), diving plumes, attenuation mechanisms, migration routes, preferential pathways (geologic and anthropogenic), magnitude of chemicals of concern and spatial and temporal changes in concentrations, and contaminant fate and transport. Please include three-dimensional plume maps for groundwater and two-dimensional soil vapor plume plan view maps to provide an accurate depiction of the contaminant distribution of each COC.

e. Summary tables of chemical concentrations in different media (i.e., soil, groundwater, and soil vapor). Please include applicable environmental screening levels on all tables. Include graphs of contaminant concentrations versus time.

f. Current and historic facility structures (e.g., buildings, drain systems, sewer systems, underground utilities, etc.) and physical features including topographical features (e.g., hills, gradients, surface vegetation, or pavement) and surface water features (e.g. routes of drainage ditches, links to water bodies). Please include current and historic site maps.

g. Current and historic site operations/processes (e.g., parts cleaning, chemical storage areas, manufacturing, etc.).

h. Other contaminant release sites in the vicinity of the site. Hydrogeologic and contaminant data from those sites may prove helpful in testing certain hypotheses for the SCM. Include a summary of work and technical findings from nearby release sites, including the two adjacent closed LUFT sites, (i.e., Montgomery Ward site and the Quest Laboratory site).

i. Land uses and exposure scenarios on the facility and adjacent properties. Include beneficial resources (e.g., groundwater classification, wetlands, natural resources, etc.), resource use locations (e.g., water supply wells, surface water intakes), subpopulation types and locations (e.g., schools, hospitals, day care centers, etc.), exposure scenarios (e.g. residential, industrial, recreational, farming), and exposure pathways, and potential threat to sensitive receptors. Include an analysis of the contaminant volatilization from the subsurface to indoor/outdoor air exposure route (i.e., vapor pathway). Please include copies of Sanborn maps and aerial photographs, as appropriate.

j. Identification and listing of specific data gaps that require further investigation during subsequent phases of work. Proposed activities to investigate and fill data gaps identified.

TABLE 1

INITIAL SITE CONCEPTUAL MODEL

CSM Element	CSM Sub-Element	Description	Data Gap	How to Address
Geology and Hydrogeology	Regional	The site is in the northwest portion of the Livermore Valley, which consists of a structural trough within the Diablo Range and contains the Livermore Valley Groundwater Basin (referred to as "the Basin") (DWR, 2006). Several faults traverse the Basin, which act as barriers to groundwater flow, as evidenced by large differences in water levels between the upgradient and downgradient sides of these faults (DWR, 2006). The Basin is divided into 12 groundwater basins, which are defined by faults and non-water-bearing geologic units (DWR, 1974). The hydrogeology of the Basin consists of a thick sequence of fresh-water-bearing continental deposits from alluvial fans, outwash plains, and lacustrine environments to up to approximately 5,000 feet bgs (DWR, 2006). Three defined fresh-water bearing geologic units exist within the Basin: Holocene Valley Fill (up to approximately 400 feet bgs in the central portion of the Basin), the Plio-Pleistocene Livermore Formation (generally between approximately 400 and 4,000 feet bgs in the central portion of the Basin), and the Pliocene Tassajara Formation (generally between approximately 250 and 5,000 or more feet bgs) (DWR, 1974). The Valley Fill units in the western portion of the Basin are capped by up to 40 feet of clay (DWR, 2006).	None	NA
	Site	***Geology:*** Borings advanced at the site indicate that subsurface materials consist primarily of finer-grained deposits (clay, sandy clay, silt and sandy silt) with interbedded sand lenses to 20 feet below ground surface (bgs), the approximate depth to which these borings were advanced. The documented lithology for one on-site boring that was logged to approximately 45 feet bgs indicates that beyond approximately 20 feet bgs, fine-grained soils are present to approximately 45 feet bgs. A cone penetrometer technology test indicated the presence of sandier lenses from approximately 45 to 58 feet bgs and even coarser materials (interbedded with finer-grained materials) from approximately 58 feet to 75 feet bgs, the total depth drilled. The lithology documented at the site is similar to that reported at other nearby sites, specifically the Montgomery Ward site (7575 Dublin Boulevard), the Quest laboratory site (6511 Golden Gate Drive), the Shell-branded Service Station site (11989 Dublin Boulevard), and the Chevron site (7007 San Ramon Road). ***Hydrogeology:*** Shallow groundwater has been encountered at depths of approximately 9 to 15 feet bgs. The hydraulic gradient and groundwater flow direction have not been specifically evaluated at the site.	As noted, most borings at the site have been advanced to approximately 20 feet bgs, and one boring has been advanced and logged to 45 feet bgs; CPT data was collected to 75 feet bgs at one location. Lithologic data will be obtained from additional borings that will be advanced on site to further the understanding of the subsurface, especially with respect to deeper lithology. The on-site shallow groundwater horizontal gradient has not been confirmed. Additionally, it is not known if there may be a vertical component to the hydraulic gradient.	Two direct push borings and four multi-port wells will be advanced to depth (up to approximately 75 feet bgs) and soil lithology will be logged. See items 4 and 5 on Table 2. Shallow and deeper groundwater monitoring wells will be installed to provide information on lateral and vertical gradients. See Items 2 and 5 on Table 2.
Surface Water Bodies		The closest surface water bodies are culverted creeks. Martin Canyon Creek flows from a gully west of the site, enters a culvert north of the site, and then bends to the south, passing approximately 1,000 feet east of the site before flowing into the Alamo Canal. Dublin Creek flows from a gully west of the site, enters a culvert approximately 750 feet south of the site, and then joins Martin Canyon Creek approximately 750 feet southeast of the site.	None	NA
Nearby Wells		The State Water Resources Control Board's GeoTracker GAMA website includes information regarding the approximate locations of water supply wells in California. In the vicinity of the site, the closest water supply wells presented on this website are depicted approximately 2 miles southeast of the site; the locations shown are approximate (within 1 mile of actual location for California Department of Public Health supply wells and 0.5 mile for other supply wells). No water-producing wells were identified within 1/4 mile of the site in the well survey conducted for the Quest Laboratory site (6511 Golden Gate Drive; documented in 2009); information documented in a 2005 report for the Chevron site at 7007 San Ramon Road indicates that a water-producing well may exist within 1/2 mile of the site.	A formal well survey is needed to identify water-producing, monitoring, cathodic protection, and dewatering wells.	Obtain data regarding nearby, permitted wells from the California Department of Water Resources and Zone 7 Water Agency (Item 11 on Table 2).

TABLE 2

DATA GAPS AND PROPOSED INVESTIGATION

Item	Data Gap	Proposed Investigation	Rationale	Analysis
5	Evaluate the possible presence of impacts to deeper groundwater. Evaluate deeper groundwater concentration trends over time. Obtain data regarding the vertical groundwater gradient. Obtain more lithological data below 20 feet bgs.	Install four continuous multichannel tubing (CMT) groundwater monitoring wells (aka multi-port wells) to approximately 65 feet bgs in the northern parking lot with ports at three depths (monitoring well locations may be adjusted pending results of shallow grab groundwater samples; we will discuss any potential changes with ACEH before proceeding). Groundwater monitoring frequency to be determined. Soil samples will be collected only if there are field indications of impacts. Soil lithology will be logged. However, information regarding the moisture content of soil may not be reliable using sonic drilling technology (two borings will be logged using direct push technology; see Item 4, above).	One well is proposed at the western (upgradient) property boundary to confirm that there are no deeper groundwater impacts from upgradient. Two wells are proposed near the center of the northern parking lot to evaluate potential impacts in an area where deeper impacts, if any, would most likely to be found. One well is proposed at the eastern (downgradient) property boundary to confirm that there are no impacts extending off-site. Port depths will be chosen based on the locations of saturated soils (as logged in direct push borings; see Item 4, above), but are expected at approximately 15, 45, and 60 feet bgs.	*Groundwater:* VOCs by EPA Method 8260, dissolved oxygen, oxidation/reduction potential, temperature, pH, and specific conductance.
6	Evaluate possible off-site migration of impacted soil vapor in the downgradient direction (east). Evaluate concentration trends over time.	Install 4 temporary nested soil vapor probes at approximately 4 and 8 feet bgs along the eastern property boundary. Based on the results of the sampling, two sets of nested probes will be converted to vapor monitoring wells to allow for evaluation of VOC concentration trends over time.	Available data indicate that PCE and TCE are present in soil vapor in the eastern portion of the northern parking lot. Samples are proposed on approximately 50-foot intervals along the eastern property boundary to provide a transect of concentrations through the vapor plume. The depths of 4 and 8 feet bgs are chosen to provide data closest to the source (i.e., groundwater) while avoiding saturated soil, and also provide shallower data to help evaluate potential attenuation within the soil column. Two sets of nested vapor probes will be converted into vapor monitoring wells (by installing well boxes at ground surface); the locations of the permanent wells will be chosen based on the results of samples from the temporary probes.	*Soil vapor* : VOCs by EPA Method TO-15.
7	Evaluate potential for off-site migration of impacted groundwater in the downgradient direction (east).	Advance two borings to approximately 20 feet bgs in the parking lot of the property east of the Crown site for collection of grab groundwater samples.	Two borings are proposed off-site, on the property east of the Crown site, just east of the building in the expected area of highest potential VOC concentrations.	*Groundwater:* VOCs by EPA Method 8260, dissolved oxygen, oxidation/reduction potential, temperature, pH, and specific conductance.
8	Evaluate VOC concentrations just north of the highest concentration area.	Advance two borings to approximately 20 feet bgs north of Building A for collection of soil and grab groundwater samples. Soil samples will be collected at two depths in the vadose zone. Soil samples will be collected based on field indications of impacts (PID readings, odor, staining) or, in the absence of field indications of impacts, at 5 and 10 feet bgs.	The highest concentrations of PCE in groundwater were detected at boring NM-B-32, just north of Building A. The nearest available data to the north are approximately 75 feet away. One of the borings will be advanced approximately 20 feet north of NM-B-32 to provide data close to the highest concentration area. A second boring will be advanced approximately halfway between the first boring and former boring NM-B-33 to provide additional spatial data for contouring purposes. These borings will be part of a transect in the highest concentration area.	*Groundwater:* VOCs by EPA Method 8260, dissolved oxygen, oxidation/reduction potential, temperature, pH, and specific conductance. *Soil:* VOCs by EPA Method 8260 (soil samples to be collected using field preservation in accordance with EPA Method 5035).
9	Evaluate VOC concentrations in soil vapor in the south parcel of the site.	Install four temporary soil vapor probes at approximately 5 feet bgs around boring SV-25, where PCE was detected in soil vapor at a low concentration.	PCE was detected in soil vapor sample SV-25 in the southern parcel, although was not detected in groundwater in that area. Three probes will be installed approximately 30 feet from of boring SV-25 to attempt to delineate the extent of impacts. A fourth probe is proposed west of the original sample, close to the property boundary and the location of mapped utility lines, which may be a potential conduit, to evaluate potential impacts from the west.	*Soil vapor* : VOCs by EPA Method TO-15.
10	Obtain additional information regarding subsurface structures and utilities to further evaluate migration pathways and sources.	Ground penetrating radar (GPR) and other utility locating methodologies will be used, as appropriate, to further evaluate the presence of unknown utilities and structures at the site.	Utilities have been identified at the site that include an on-site sewer lateral and drain line, and shallow water, electric, and gas lines. Given the current understanding of the distribution of PCE in groundwater at the site, it is possible that other subsurface utilities, and specifically sewer laterals, exist that may act as a source or migration pathway for distribution of VOCs in the subsurface.	NA